

Checklist of birds at Bhatye estuary and adjacent areas, Maharashtra

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Abstract

This study presents avian diversity of Bhatye estuary and adjacent areas where surveys have been conducted for two years (2009-2010) in five different localities, which were categorized on the basis of habitat differences. Total 113 bird species belonging to 14 orders and 41 families were observed at five different localities. Out of these 113 species, 80 species were residential, 17 species were residential (local) migratory and 16 species were migratory. Most of the residential and migratory species belonged to aquatic bird group. Some incidences were noticed regarding human interference, especially mangrove cutting for firewood, salting and drying of fishes under net and fencing commercial trees by nets to avoid roosting by birds, which directly influenced avifauna. Two near threatened and three vulnerable species were observed during the surveys. Measures should be taken to protect diverse habitat and avifauna around Bhatye estuary without disturbing fishery and mango cultivation practices.

Introduction

Coastal wetlands and estuaries are diverse systems providing important habitats for flora and fauna including migratory and indigenous fish and bird species, in addition to often supporting commercial and recreational fisheries (Stumpf and Haines 1998). India has a vast coastline which is an important habitat for resident and migratory shorebirds. Bird-count exercises undertaken in India have mainly focussed on endangered birds, wetland birds, heronries and birds found in conservational significant terrestrial habitats (Urfi et al. 2005). The rapid world-wide loss of wetlands (Mitsch & Gosselink 2000) has significantly increased the importance of such habitats.

Water birds are an important component of wetland ecosystems, as they form vital links in the food webs. Many water birds are migratory, undertaking annual movements between their breeding and non-breeding grounds. In the process, they regularly cross national boundaries. Therefore, it is the communal duty of all nations to make efforts for their conservation. Baseline information is a condition for planning and monitoring

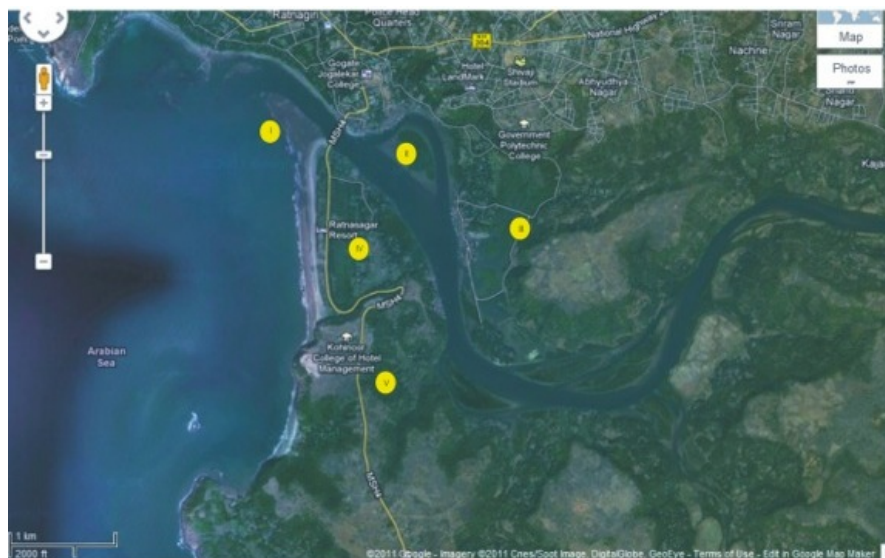


Fig.1 Site map of Bhatye Estuary and adjacent area

I- Mouth of the Bhatye estuary and Bhatye open coast, II- Mangrove Island, III- Kerla back water, IV- Regional coconut Research Station, V- Fansop hilly area with Mango plantation

management actions for waterbirds and their habitats (Wetlands Int. 2002; Arun kumar et al. 2003).

Ratnagiri is located close to open coast and estuary and is well known as major landing centre for marine fishery along west coast of Maharashtra. Out of 20 major and minor estuaries and creeks in Ratnagiri District, Bhatye estuary is well known for excellent production of shellfishes, and having good biotic and abiotic environment with excellent diversity of molluscs and mangroves (Maske 2007). Bhatye estuary provides diverse habitat which is helpful to maintain diverse flora and fauna. Urban biodiversity has received very little attention from conservation biologists as compared to natural and protected ecosystems (Jules 1997; Vandermeer 1997). Especially less attention was given to avifauna. According to Newton (1995), birds are ideal bio-indicators and useful models for studying a variety of environmental problem.

We present the status of avifauna along Bhatye estuary and adjacent area which provides habitat diversity and focus on habitat dependant bird diversity.

Material and method

In the present study, observations of birds along study area were carried out twice a day (Morning and evening), throughout the year (December 2009- December 2010). Observations were

made with a binocular. The identification and status of the species were made with the help of standard literature (Salim Ali 2002; Grimmett et al. 2007).

Study area

Bhatye Estuary - The Bhatye estuary is situated (73° 15' E and 16°51' N) near Ratnagiri (Maharashtra). Estuary is formed by river Kajli, having open shore on western side with fine sand and on eastern side estuary with less sand and more mud in Bhatye village area. On the basis of vegetation and geographical variability, Bhatye estuary is divided into five sites in present study (Fig. 1).

I) Mouth of the Bhatye estuary and Bhatye open coast - Mouth of the estuary opens in sea at north side and continued with bhatye open coast having black sand.

II) Mangrove Island -Mangrove Island is present close to the mouth of estuary, having 1 km² area.

III) Kerla back water - It is present at the East bank of Bhatye estuary away from mouth of estuary/ open coast. Kerla back water is marshy area

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Table 1. Checklist of birds at Bhatye Estuary and adjacent areas near Ratnagiri, Maharashtra

Order	Families	Name of species	Common name	Status	Site I	Site II	Site III	Site IV	Site V
Anseriformes	Anatidae	<i>Anas acuta</i> (Linnaeus)	Northern Pintail	M			✓		
		<i>Anas querquedula</i> (Linnaeus)	Garganey	M			✓		
		<i>Anas penelope</i> (Linnaeus)	Eurasian Wigeon	M			✓		
Charadriiformes	Laridae	<i>Sterna bergii</i> (Lichtenstein)	Greater Crested Tern	R	✓				
		<i>Larus canus</i> (Linnaeus)	Mew Gull	M	✓				
		<i>Larus brunnicephalus</i> (Jerdon)	Brown headed gull	M	✓				
	Recurvirostridae	<i>Himantopus himantopus</i> (Linnaeus)	Black-winged Stilt	R	✓	✓	✓		
	Charadriidae	<i>Charadrius mongolus</i> (Pallas)	Lesser Sand Plover	M	✓	✓	✓		
		<i>Charadrius dubius</i> (Scopoli)	Little ringed plover	LM		✓	✓		
		<i>Charadrius alexandrinus</i> (Linnaeus)	Kentish plover	LM		✓	✓		
Piciformes	Picidae	<i>Dinopium javanense</i> (Ljungh)	Common golden backed woodpecker	R				✓	✓
	Ramphastidae	<i>Megalaima haemacephala</i> (Muller)	Copper smith barbet	R				✓	✓
		<i>Megalaima zeylanica</i> (Gmelin)	Brown headed barbet	R				✓	✓
Coraciiformes	Bucerotidae	<i>Ocyrceros birostris</i> (Scopoli)	Indian grey hornbill	R		✓		✓	✓
		<i>Anthraceroceros coronatus</i> (Boddaert)	Malabar pied hornbill	R		✓		✓	✓
	Alcedinidae	<i>Halcyon smyrnensis</i> (Linnaeus)	White-breasted Kingfisher	R		✓	✓	✓	✓
		<i>Pelargopsis capensis</i> (Linnaeus)	Stork billed kingfisher	R			✓		
		<i>Ceyx erithacus</i> (Linnaeus)	Oriental dwarf kingfisher	R		✓	✓	✓	✓
		<i>Alcedo atthis</i> (Linnaeus)	Small blue kingfisher	LM		✓	✓	✓	
		<i>Ceryle rudis</i> (Linnaeus)	Lesser Pied Kingfisher	R			✓		
		<i>Alcedo meninting</i> (Horsfield)	Blue eared kingfisher	R		✓	✓	✓	
	Meropidae	<i>Merops orientalis</i> (Latham)	Small Green Bee-eater	R			✓	✓	✓
		<i>Merops leschenaulti</i> (Vieillot)	Chestnut headed Bee-eater	R				✓	
Cuculiformes	Cuculidae	<i>Phaenicophaeus viridirostris</i> (Jerdon)	Small Green-billed Malkoha	R					✓
		<i>Phaenicophaeus tristis</i> (Lesson)	Large Green-billed Malkoha	R					✓
		<i>Eudynamys scolopacea</i> (Linnaeus)	Asian koel	R			✓	✓	✓
		<i>Centropus sinensis</i> (Stephens)	Greater Coucal	R				✓	✓
		<i>Centropus bengalensis</i> (Gmelin)	Lesser Coucal	R				✓	✓
Psittaciformes	Psittacidae	<i>Psittacula krameri</i> (Scopoli)	Rose ringed parakeet	R		✓	✓	✓	✓
		<i>Loriculus vernalis</i> (Sparman)	Indian hanging parrot	R					✓
Strigiformes	Strigidae	<i>Athene brama</i> (Temminck)	Spotted owl	LM				✓	✓
Columbiformes	Columbidae	<i>Columba livia</i> (Gmelin)	Blue rock pigeon	R			✓	✓	✓
		<i>Columba elphinstonii</i> (Sykes)	Nilgiri wood Pigeon	R					✓
		<i>Streptopelia chinensis</i> (Scopoli)	Spotted Dove	R			✓	✓	✓
		<i>Streptopelia decaocto</i> (Frivaldszky)	Eurasian collared dove	R				✓	✓
		<i>Streptopelia senegalensis</i> (Linnaeus)	Little brown dove	R				✓	✓
Gruiformes	Rallidae	<i>Amaurornis Phoenicurus</i> (Pennant)	White-breasted Waterhen	R		✓	✓		
Charadriiformes	Scolopacidae	<i>Calidris ferruginea</i> (Pontoppidan)	Curlew Sandpiper	M	✓	✓	✓		
		<i>Calidris minuta</i> (Leisler)	Little stint	M		✓	✓		
		<i>Calidris temminckii</i> (Leisler)	Temminck's stint	M	✓	✓	✓		
		<i>Calidris subminuta</i> (Middendorff)	Long-toed Stint	M	✓	✓	✓		
		<i>Tringa stagnatilis</i> (Bechstein)	Marsh sandpiper	M	✓	✓	✓		
		<i>Tringa glareola</i> (Linnaeus)	Wood sandpiper	M		✓	✓		
		<i>Limicola falcinellus</i> (Pontoppidan)	Broad-billed Sandpiper	M		✓	✓		
		<i>Tringa erythropus</i> (Pallas)	Spotted redshank	M		✓	✓		
		<i>Numenius arquata</i> (Linnaeus)	Eurasian Curlew	LM	✓	✓	✓		
		<i>Tringa totanus</i> (Linnaeus)	Common redshank	LM		✓	✓		
		<i>Tringa nebularia</i> (Gunnerus)	Common greenshank	M		✓	✓		

	Chradriidae	<i>Vanellus indicus</i> (Boddaert)	Red wattled lapwing	R			✓	✓	✓
Falconiformes	Accipitridae	<i>Milvus migrans</i> (Boddaert)	Black kite	R	✓	✓	✓	✓	✓
		<i>Haliastur indus</i> (Boddaert)	Brachminy kite	R	✓	✓	✓	✓	✓
		<i>Haliaeetus leucogaster</i> (Gmelin)	White bellied sea-eagle	R	✓			✓	
		<i>Accipiter badius</i> (Gmelin)	Shikara	R				✓	✓
Pelecaniformes	Phalacrocoracidae	<i>Phalacrocorax niger</i> (Vieillot)	Little cormorant	LM		✓	✓		
		<i>Phalacrocorax fuscicollis</i> (Stephens)	Indian cormorant	R		✓	✓		
Coniiformes	Ardeidae	<i>Egretta garzetta</i> (Linnaeus)	Little Egret	R	✓	✓	✓		
		<i>Mesophoyx intermedia</i> (Wagler)	Median Egret	LM	✓	✓	✓		
		<i>Casmerodius albus</i> (Linnaeus)	Great Egret	LM	✓	✓	✓		
		<i>Egretta gularis</i> (Bosc)	Western Reef Egret	LM		✓	✓		
		<i>Bubulcus ibis</i> (Linnaeus)	Cattle egret	R			✓		✓
		<i>Ardeola grayii</i> (Sykes)	Indian pond – heron	R		✓	✓		
		<i>Ardeola bacchus</i> (Bonaparte)	Chinese Pond–heron	LM		✓	✓		
		<i>Butorides striatus</i> (Linn.)	Little heron	R		✓	✓		
		<i>Ixobrychus minutus</i> (Linnaeus)	Little Bittern	R		✓	✓	✓	
		<i>Ixobrychus sinensis</i> (Gmelin)	Yellow Bittern	R		✓	✓		
Passeriformes	Laniidae	<i>Lanius vittatus</i> (Valenciennes)	Bay backed shrike	R				✓	✓
		<i>Lanius schach</i> (Linnaeus)	Rufous backed shrike	R				✓	✓
	Corvidae	<i>Corvus splendens</i> (Vieillot)	House crow	R	✓	✓	✓	✓	✓
		<i>Corvus macrorhynchos</i> (Wagler)	Jungle crow	R	✓	✓	✓	✓	✓
		<i>Urocissa flavirostris</i> (Latham)	Indian treepie	R				✓	✓
	Oriolidae	<i>Oriolus oriolus</i> (Linnaeus)	Euracian golden oriole	LM				✓	✓
		<i>Oriolus xanthornus</i> (Linnaeus)	Black hooded oriol	R					✓
	Campephagidae	<i>Pericrocotus cinnamomeus</i> (Linnaeus)	Small Minivet	R				✓	✓
		<i>Pericrocotus ethologus</i> (Bangs & Phillips)	Long-tailed Minivet	R				✓	✓
	Dicruridae	<i>Dicrurus macrocercus</i> (Vieillot)	Black Drongo	R	✓			✓	✓
		<i>Dicrurus leucophaeus</i> (Vieillot)	Ashy Drongo	M				✓	✓
	Aegithinidae	<i>Aegithina nigrolutea</i> (Marshall)	Marshall's iora	R				✓	✓
	Hirundinidae	<i>Hirundo rustica</i> (Linnaeus)	Common Swallow	LM	✓	✓	✓	✓	✓
		<i>Hirundo smithii</i> (Leach)	Wire-tailed swallow	R	✓	✓	✓	✓	✓
		<i>Hirundo concolor</i> (Sykes)	Dusky crag martin	R		✓		✓	✓
		<i>Hirundo daurica</i> (Laxmann)	Red-Rumped Swallow	LM		✓	✓	✓	✓
	Muscicapidae	<i>Copsychus saularis</i> (Linnaeus)	Oriental Magpie Robin	R		✓	✓	✓	✓
		<i>Saxicoloides fulcata</i> (Linnaeus)	Indian robin	R		✓	✓	✓	✓
	Rhipiduridae	<i>Rhipidura aureola</i> (Lesson)	White browed fantail flycatcher	R				✓	✓
	Cisticolidae	<i>Prinia hodgsonii</i> (Blyth)	Franklin's prinia	R				✓	✓
		<i>Prinia buchanani</i> (Blyth)	Rufous fronted prinia	R				✓	✓
		<i>Prinia socialis</i> (Sykes)	Ashy prinia	R				✓	✓
	Turdidae	<i>Turdus merula</i> (Linnaeus)	Urasian blackbird	LM					✓
	Sturnidae	<i>Sturnus pagodarun</i> (Gmelin)	Brahmny starling	R				✓	✓
		<i>Acridotheres tristis</i> (Linnaeus)	Common myna	R	✓	✓	✓	✓	✓
		<i>Acridotheres fuscus</i> (Wagler)	Jungle myna	R		✓	✓	✓	✓
	Paridae	<i>Parus xanthogenys</i> (Vigors)	Black-lored yellow tit	R			✓	✓	
	Pycnonotidae	<i>Pycnonotus cafer</i> (Linnaeus)	Red vented bulbul	R		✓	✓	✓	✓
		<i>Pycnonotus jocosus</i> (Linnaeus)	Red whiskered bulbul	R				✓	✓
		<i>Pycnonotus luteolus</i> (Lesson)	White-browed Bulbul	R				✓	✓
	Timaliidae	<i>Timalia pileata</i> (Horsfield)	Red capped babbler	R				✓	✓
		<i>Gampsorhynchus rufulus</i> (Blyth)	White hooded babbler	R				✓	✓
		<i>Turdoides striatus</i> (Dumont)	Jungle babbler	R			✓	✓	✓
		<i>Turdoides longirostris</i> (Hodgson)	Slender billed babbler	R				✓	✓
	Sylviidae	<i>Turdoides caudatus</i> (Dumont)	Common babbler	R			✓	✓	✓
		<i>Turdoides affinis</i> (Jerdon)	Yellow-billed Babbler	R				✓	✓
		<i>Orthotomus sutorius</i> (Pennant)	Common Tailorbird	R				✓	✓
		<i>Phylloscopus trochiloides</i> (Sundevall)	Greenish Warbler	LM			✓		

	Nectarinidae	<i>Nectarinia zeylonica</i> (Linnaeus)	Purple-rumped sunbird	R		✓	✓	✓	✓
		<i>Nectarinia asiatica</i> (Latham)	Purple sunbird	R		✓		✓	✓
	Dicaeidae	<i>Dicaeum erythrorhynchos</i> (Latham)	Tickell's flowerpecker	R				✓	✓
	Passeridae	<i>Passer domesticus</i> (Linnaeus)	House sparrow	R		✓	✓	✓	✓
	Motacillidae	<i>Motacilla alba</i> (Linnaeus)	White Wagtail	LM		✓	✓		
	Ploceinae	<i>Ploceus philippinus</i> (Linnaeus)	Baya weaver	R				✓	✓
	Estrildidnae	<i>Lonchura Malacca</i> (Linnaeus)	Black headed munia	R				✓	
		<i>Lonchura punctulata</i> (Linnaeus)	Spotted munia	R			✓	✓	
		<i>Lonchura striata</i> (Linnaeus)	White rumped munia	R			✓		
		<i>Lonchura malabarica</i> (Linnaeus)	Indian Silverbill	R				✓	✓
Total Order- 14	Total Families - 41	Total Species - 113			22	51	64	70	68

Site I - Mouth of the Bhatye estuary and Bhatye open coast, **Site II** - Mangrove Island, **Site III** - Kerla back water, **Site IV** - Regional Coconut Research Station, **Site V** - Fansop hilly area with Mango Plantation, **R (Resident)** - 80 species, **LM (Local Migratory)** - 17 species, **M (Migratory)** - 6 species

with full mangrove vegetation and having three small man-made tanks of brackish water as well as paddy field.

IV) Regional Coconut Research Station (RCRS) – Regional Coconut Research Station covers an area of 26.64 hector along western margin of Bhatye estuary. This research station having variety of spice plants (approximately 12 species) and diverse economically important fruit plant species, dominated by coconut (27 var.), Beetel nut, Banana, Pineapple, Kokum etc.

V) Fansop hilly area with Mango Plantation – It is located on southern side of Bhatye estuary. It has dense mango plantation with hilly areas as well as Paddy farm at foot hills.

Results and Discussion

We recorded 113 species of birds belonging to 14 orders and 41 families. Out of the 113 species, 80 species were residential to the Bhatye estuary and adjacent areas, 17 species were local migratory and 16 species are migratory (Table. 1).

Species diversity as per site

I) Mouth of the Bhatye estuary and Bhatye open coast

– Near the mouth of the estuary and open coast of the Bhatye overall 22 species were observed, out of which 11 residential, 4 local migratory and 7 migratory bird species were recorded. In this region most of birds were aquatic waders. Migratory birds observed in this area were mainly observed during winter season.

II) Mangrove Island – At the mangrove Island and bank of the estuary total 51 bird species were observed out of which 28 residential, 13 local migratory and 10 migratory bird species were recorded. Birds observed in this area were also belongs to aquatic waders. Migratory birds observed in this area were mainly observed during winter season.

III) Kerla back water – At the Kerla back water total 64 bird species were observed out of which 37 residential, 14 local migratory and 13 migratory bird species were recorded. Most of the birds observed in this area were belongs to aquatic waders. Migratory birds observed in this area were mainly observed during winter season.

IV) Regional Coconut Research Station – At the Regional Coconut Research Station total 70 bird species

were observed out of which 64 residential, five local migratory and one migratory bird species were recorded. Most of the birds observed in this area were belongs to aquatic waders. The only one migratory bird observed in this location was Ashy Drongo, *Dicrurus leucophaeus*.

V) Fansop hilly area with Mango Plantation – At the Fansop hilly area with Mango Plantation, total 68 bird species were observed out of which 62 residential, five local migratory and one migratory bird species was recorded. Most of the birds observed in this area were belongs to aquatic waders. The only one migratory bird observed in this location was Ashy Drongo, *Dicrurus leucophaeus*.

Common Swallow, (*Hirundo rustica*) and Red-Rumped Swallow (*Hirundo daurica*) were the only local migratory species found at most of the sites along Bhatye estuary. Eurasian blackbird (*Turdus merula*) and Greenish Warbler (*Phylloscopus trochiloides*), these are the only local migratory species which observed at Fansop hilly area and Kerla backwater, respectively.

Studies on vegetation have revealed that intensive biomass extraction (mainly through grazing and fuel wood collection) is leading to changes in vegetation structure and composition of the forest (Kumar & Shahabuddin 2005). These changes in forest structure are leading to changes in bird species composition (Shahabuddin & Kumar 2005). As far as Bhatye estuary and adjacent area is concern, it is dominated by mangrove species and other local plant communities with diverse landscape, which ultimately provide diversified habitat. These mangrove species and other plant communities along Bhatye estuary provide shelter and roosting sites for many bird species especially waterbirds. These bird species are threatened because of extensive cutting of mangrove species by local community for firewood.

Certain places like Bhatye, Rajiwada and Kerla village, where fish processing carried out in which salted fishes were shaded with fishing nets for sun drying. The purpose of fishing net shading during fish sun drying is to protect it from birds as well as from other animals which feed on fishes. Many times birds entangled in these nets and resulted in to death. Around mango plantation farmers apply fishing nets to protect their crops from birds, here also many birds like parakeets, mynas, sparrows, crows etc. get entangled in these nets and died because of injury

particularly to their neck and wings. Habitat loss or degradation is the major cause of threat to the biodiversity of the Asian region. A broad range of national policies, particularly on forestry, agriculture, wetlands and fisheries, can have significant impacts on biodiversity conservation. By ensuring that policies and laws (at local, provincial and national levels) taking into account the principle of conservation, threats to species can be minimized (Arun kumar et al. 2003).

(White bellied sea-eagle) *Haliaeetus leucogaster* and (Malabar Pied Hornbill) *Anthraceroceros coronatus* are the vulnerable species (The Red Data Book on Indian Animals, Part 1: Vertebrata, of Zoological Survey of India, 1994) included in Schedule I (Section III Birds) of the Wildlife Protection Act amended up to 2006, found along Bhatye estuary and its coastal region. Whereas Malabar Pied Hornbill included in Near Threatened categories by IUCN Red List of Threatened Species (2002) (Chandra and Mahabal 2009; Chandra and Gupta 2009). Beside this, Vulnerable species like *Columba elphinstonii* (Nilgiri wood pigeon), *Turdoides longirostris* (Slender billed babbler) and Near Threatened species like *Numenius arquata* (Eurasian Curlew) as per IUCN Red List of Threatened Species (IUCN 2011) were also sighted at Bhatye estuary and its adjacent areas. Lawate and Mule (2008) also recorded Nilgiri wood pigeon from Chandoli National Park of which some area comes in Ratnagiri District.

Conclusion

Bhatye estuary and its adjacent areas representing diverse avifauna including some Vulnerable as well as Near Threatened species, which were influenced by different anthropogenic activities. By considering these facts, there is a need for awareness in coastal community towards conservation of such diverse avifauna and its importance with respect to coastal ecosystem.

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